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(54) **SLEEVE FOR THE CHAMBER OF A SPORT PISTOL OR SPORT RIFLE AND METHOD FOR MANUFACTURING SAME**

(57) Bushing for the chamber of a sporting pistol or rifle and the procedure for its manufacture.

It comprises a tubular configuration, with a connection passage with its entrance orifice (2) and exit orifice (4) characterised in that said connection passage (8) is calibrated to a predetermined value in function of the output power of the sporting pistol or rifle.

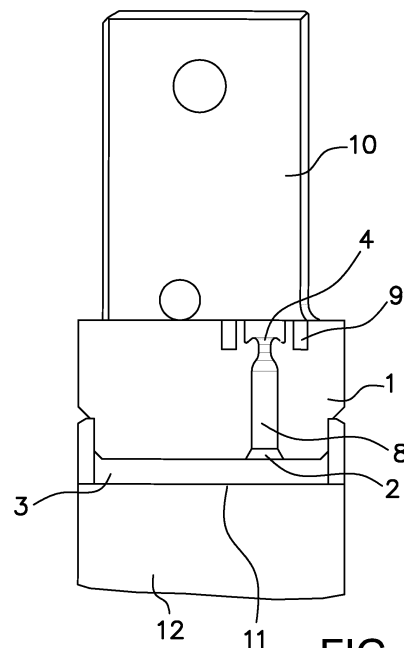


FIG. 5

Description

[0001] Bushing for the chamber of a sporting pistol or rifle and manufacturing procedure, of the type that comprises a tubular configuration, with a connection passage with its entrance orifice and exit orifice characterised in that said connection passage is calibrated to a predetermined value in function of the output power of the sporting pistol or rifle.

BACKGROUND TO THE INVENTION

[0002] Various sporting rifles or pistols are known in the state of the art that adapt to various output powers depending on the country. For this, they employ springs in the sporting rifle or pistol chamber.

[0003] The applicant company of Spanish Utility Model No 0210145 "PNEUMATIC RIFLE WITHOUT RECOIL EFFECT", of 1975, currently in the public domain, which refers to a pneumatic rifle without recoil effect, essentially characterised in that the assembly comprising the pneumatic chamber, barrel, air compressor piston and drive spring, together with the associated housing and securing components form a mobile group that is forward when the rifle is loaded by breaking the barrel, remain retained during the time in which the rifle is loaded and which is released, permitting its movement, after the same is fired, compensating said recoil movement that of the conventional rifle recoil, due to the reaction produced by the shock of the piston against the front part of the chamber. Figures 1 and 2 of reference 17 show the output power regulator spring or drive spring.

BRIEF DISCLOSURE OF THE INVENTION

[0004] This invention is an improvement in the compressed air or gas sporting pistol or rifle manufacturing sector.

[0005] As can be appreciated from the invention background, one of the major drawbacks facing today's manufacturers is the fact that very costly methods are employed to regulate the output power of rifles or pistols, which involve a large amount of various parts stock, for example, springs.

[0006] The case of using springs to regulate the rifle power output requires a large number of springs with various elastic constants in order to cover all requirements.

[0007] This means that a rifle manufacturer, for example, must have a large stock of springs to meet the requirements of widely varying countries, such as Germany, Spain or the USA.

[0008] This invention intends to avoid the previously mentioned drawbacks and to enable the sporting rifle or pistol to adapt to any country and also to possible legislative modifications.

[0009] Thus, this application avoids the stocks of springs with various elastic constants, because it is the bushing that regulates the sporting rifle or pistol output power and so the same firing mechanism can always be employed without any variation.

[0010] At the same time, with this invention, mechanically rifles with less power have to withstand less mechanical stress (proportional to the rifle power), the spring impact is reduced in rifles having less power and in other words, their durability is increased.

[0011] Lastly, with respect to noise, this is reduced in a significant manner because the spring impact is less in low-power rifles.

[0012] One objective of this invention is a bushing for a sporting pistol or rifle chamber, of the type that comprises a tubular configuration, with a connection passage with its entrance orifice and exit orifice characterised in that said connection passage is calibrated to a predetermined value in function of the output power of the sporting pistol or rifle.

[0013] An additional goal of this invention is a procedure for the manufacture of a bushing for a sporting pistol or rifle chamber of the type that comprises a tubular configuration, with a connection passage with its entrance orifice and exit orifice characterised in that said connection passage is calibrated to a predetermined value in function of the output power of the sporting pistol or rifle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In order to facilitate the description, this report is accompanied by five sheets of drawings that represent a practical embodiment case, which is provided for guidelines purposes that does not limit the scope of this invention.

- Figure 1 is a perspective view of the bushing covered by this invention.
- Figure 2 is a section view of the previous bushing in the initial moment of the procedure.
- Figure 3 is a section view of the previous bushing in the moment prior to the tool striking the bushing.
- Figure 4 is a section view of the bushing when it is struck by the tool and
- Figure 5 is a section view of the bushing after applying the procedure of this bushing.

A SPECIFIC EMBODIMENT OF THIS INVENTION

[0015] In this way, Figure 1 represents bushing 1 in the form of a fork with its extensions 10, an exit orifice 4 and cavity 9.

[0016] Figure 2 illustrates bushing 1 with its extensions 10, rifle chamber 12, entrance orifice 2, a connection passage 8, exit orifice 4, cavity 9 and compression chamber 3.

[0017] Figure 3 shows bushing 1 with its extensions 10, rifle chamber 12, entrance orifice 2, connection passage 8, exit orifice 4, cavity 9, compression chamber 3, a tool 5, a striker 6 and centring element 7.

[0018] Figure 4 represents bushing 1 with its extensions 10, rifle chamber 12, entrance orifice 2, connection passage 8, exit orifice 4, cavity 9, compression chamber 3, tool 5, plunger 6 and centring element 7.

[0019] Lastly, Figure 5 illustrates bushing 1 with its extensions 10, rifle chamber 12, entrance orifice 2, connection passage 8, exit orifice 4, cavity 9 and compression chamber 3.

[0020] It is necessary to point out that bushing 1 is an embodiment like the one described in the following procedure, even though it may be developed in different manners.

[0021] Thus, in a specific embodiment, the bushing manufacturing procedure would be as follows.

[0022] Bushing 1 initially has a tubular configuration, with an entrance mouth 2 facing sporting rifle or pistol chamber 12. Said entrance mouth 2 defines a compression chamber 3.

[0023] The bushing also comprises a connection passage 8 between compression chamber 3 and the outside so that it communicates the air or gas from rifle chamber 12 with the rifle barrel (not shown).

[0024] Connection passage 8 ends in exit orifice 4.

[0025] As previously described, depending on the country and national legislation, it is necessary to regulate the pellet output power. To this end, this invention regulates exit orifice 4 so that it does not allow more air or gas than is necessary to comply with said legislation.

[0026] It commences with an exit orifice 4, the one with the most permissive regulation, in other words, its output power in joules is the highest, in order to limit said orifice according to the country.

[0027] Thus, a tool 5 is fitted over said exit orifice 4, which ends in a plunger 6, just as shown in Figure 3.

[0028] Then, the mentioned tool 5 is lowered to insert plunger 6 into exit orifice 4. The thickness of plunger 6 determines the width of exit orifice 4, in other words, if in order to obtain an output power having a specific value in joules, it has been calculated that exit orifice 4 has to be "n" millimetres, the plunger thickness shall be the same as exit orifice 4.

[0029] Subsequently, when plunger 6 is fully inserted into connection passage 8, the tool 5 strikes said exit orifice 4 and deforms it. The impact on exit orifice 4 causes it to become compressed until it adopts the shape of plunger 6 perimeter.

[0030] Then plunger 6 and tool 5 are raised until the initial position and bushing 1 is now ready for use.

[0031] Optionally, prior to lowering plunger 6, there is the option (just as shown in Figure 3 and 4) to have a centring element 7 around exit orifice 4.

[0032] This centring element 7 prevents possible deviations caused by vibration and maladjustments. It is an element that guarantees operational reliability.

[0033] Said centring element 7 connects said exit orifice 4 with the outside and has a larger diameter than that of tool 5 so that it can be housed inside it.

[0034] In turn, bushing 1 comprises cavity 9, with the shape of centring element 7 base perimeter, in which centring element 7 is partially housed.

[0035] In this embodiment, just as shown in Figure 3 and 4, centring element 7 and tool 5 are cylindrical, which facilitates adjustments of the up and down movement of tool 5.

[0036] The bushing, which is the objective of the previous procedure, comprises a tubular configuration, with an entrance mouth 2 that defines a compression chamber 3 as previously described.

[0037] Bushing 1 comprises a connection passage 8 between said compression chamber 3 and the outside, defining an exit orifice 4 that is deformed and compressed by tool 5, with the diameter of said exit orifice 4 being less than the connection passage 8 diameter and, at the same time, coincides with the outside diameter of plunger 6.

[0038] Bushing 1 comprises a cavity 9 around exit orifice 4 in which centring element 7 is partially housed.

[0039] It must be pointed out that connection passage 8 calibration could be obtained in other ways, for example, by compression, by deformation, by fitting a hollow welded cylinder inside that reduces the inside diameter of connection passage 8, etc.

[0040] It is also possible to design internal projections that reduce the inside diameter at a specific point inside referred connection passage 8.

[0041] Another option would be to perform the previous procedure in entrance orifice 2 or connection passage 8, or a combination of the two, instead of exit orifice 4.

[0042] In this way, the manufacturer would have the same sporting rifle or pistol with the same firing mechanism. When an order is received from a given country, depending on its legislation, it would have a determined output power in joules that would correspond specifically to bushing 1, which would be welded to the sporting rifle or pistol chamber output.

[0043] If another order is received from a different country, it would only be necessary to change the bushing, without any need to modify the sporting rifle or pistol firing mechanism configuration.

[0044] As an example, a series of results obtained with said procedure are provided after firing a sporting rifle:

<i>Connection passage 8 diameter (mm)</i>	<i>Exit orifice 4 section (mm²)</i>	<i>Energy (mean values in joules)</i>
0.5	0.20	0.32
0.6	0.28	0.31
0.7	0.38	0.42
0.8	0.50	0.55
1.1	0.95	1.05
1.3	1.33	7.40
1.5	1.77	10.53
1.6	2.01	11.82
1.8	2.54	13.61
2.0	3.14	14.63
2.2	3.80	16.22
2.6	5.31	19.13
3.2	8.04	19.67

[0045] Relating to the so-called commercial energies, those that are employed according to national legislation, some examples are given below of the required diameters for exit orifice 4.

<i>Connection passage 8 diameter (mm)</i>	<i>Exit orifice 4 section (mm²)</i>	<i>Energy (mean values in joules)</i>
1.2	1.13	7.5
1.4	1.54	10.0
1.5	1.77	12.0
2.1	3.46	16.0

[0046] An example of energy values corresponding to the legislations of certain countries.

<i>Country</i>	<i>Output power by Law (joules)</i>
Germany, Italy, Russia and Lithuania	7.5
Sweden and France	10.0
Latvia	12.0
The United Kingdom and Trinidad and Tobago	16.0
Spain, South Africa, Finland, New Zealand, Belgium, Australia and Brazil	24.2
USA	> 24.2

[0047] This invention described a new bushing for sporting pistol or rifle chamber and the procedure for its manufacture. The examples mentioned here do not limit this invention, which thus may have various applications and/or adaptations, all within the scope of the following claims.

Claims

1. Bushing for the chamber of a sporting pistol or rifle, of the type that comprises a tubular configuration, with a connection passage with its entrance orifice (2) and exit orifice (4) **characterised in that** said connection passage (8) is calibrated to a predetermined value in function of the output power of the sporting pistol or rifle.
2. Bushing in accordance with claim 1 **characterised in that** calibration consists of deformation or compression of either connection passage (8), or exit orifice (4), or entrance orifice (2), or a combination thereof.
3. Bushing in accordance with claim 2 **characterised in that** said bushing (1) comprises a connection passage (8) between a compression chamber (3) and the outside, defining a deformed compressed exit orifice (4), with the diameter of said exit orifice (4) being less than the connection passage (8) diameter.
4. Bushing in accordance with at least one of the previous claims **characterised in that** exit orifice (4) comprises a cavity (9), which partially houses a centring element (7).
5. Procedure for the manufacture of a bushing for a sporting pistol or rifle chamber of the type that comprises a tubular configuration, with a connection passage with its entrance orifice (2) and exit orifice (4) **characterised in that** said connection passage (8) is calibrated to a predetermined value in function of the output power of the sporting pistol or rifle.
6. Procedure in accordance with claim 5 **characterised in that** calibration consists of deformation or compression of either connection passage (8) or exit orifice (4), or entrance orifice (2), or a combination thereof.
7. Procedure in accordance with claim 5 or 6 **characterised in that** it also comprises the following stages:
 - An exit orifice (4) facing a tool (5), ending in a plunger (6), over said exit orifice (4),
 - tool (5) is lowered and the plunger enters exit orifice (4) until the end of tool (5) plunger strikes said exit orifice (4) causing it to become compressed until it adopts the shape of plunger (6) perimeter, and
 - plunger (6) and tool (5) rise to the initial position.
8. Procedure in accordance with claim 7 **characterised in that** prior to the lowering of plunger (6), there is a centring element (7) around exit orifice (4), which connects said exit orifice (4) with the outside, having a diameter greater than that of tool (5).
9. Procedure in accordance with claim 8 **characterised in that** the bushing comprises a cavity (9) in which the centring element (7) is partially housed.
10. Procedure in accordance with some of previous claims 7 to 9 **characterised in that** the centring element (7) and tool (5) are cylindrical.

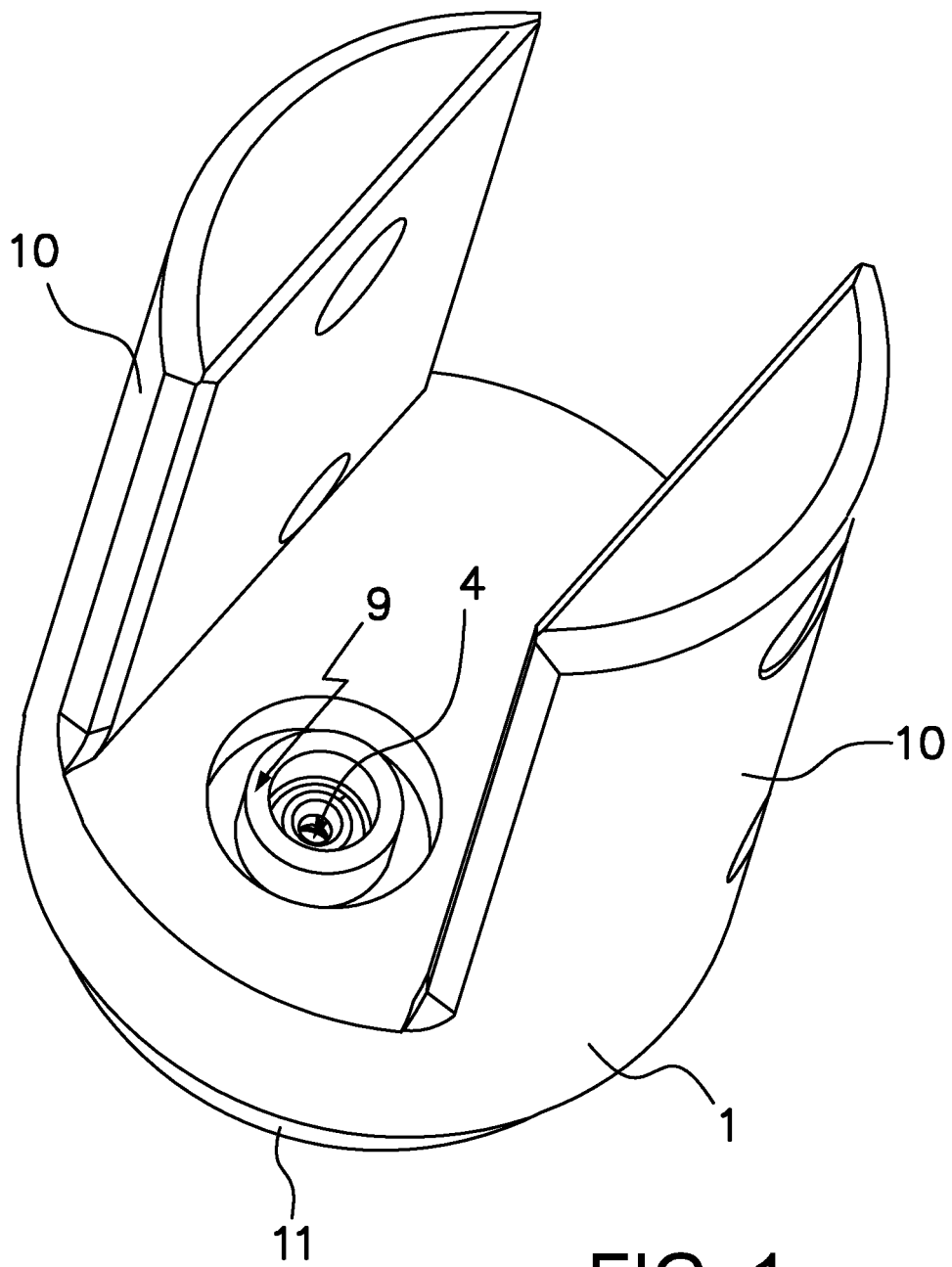
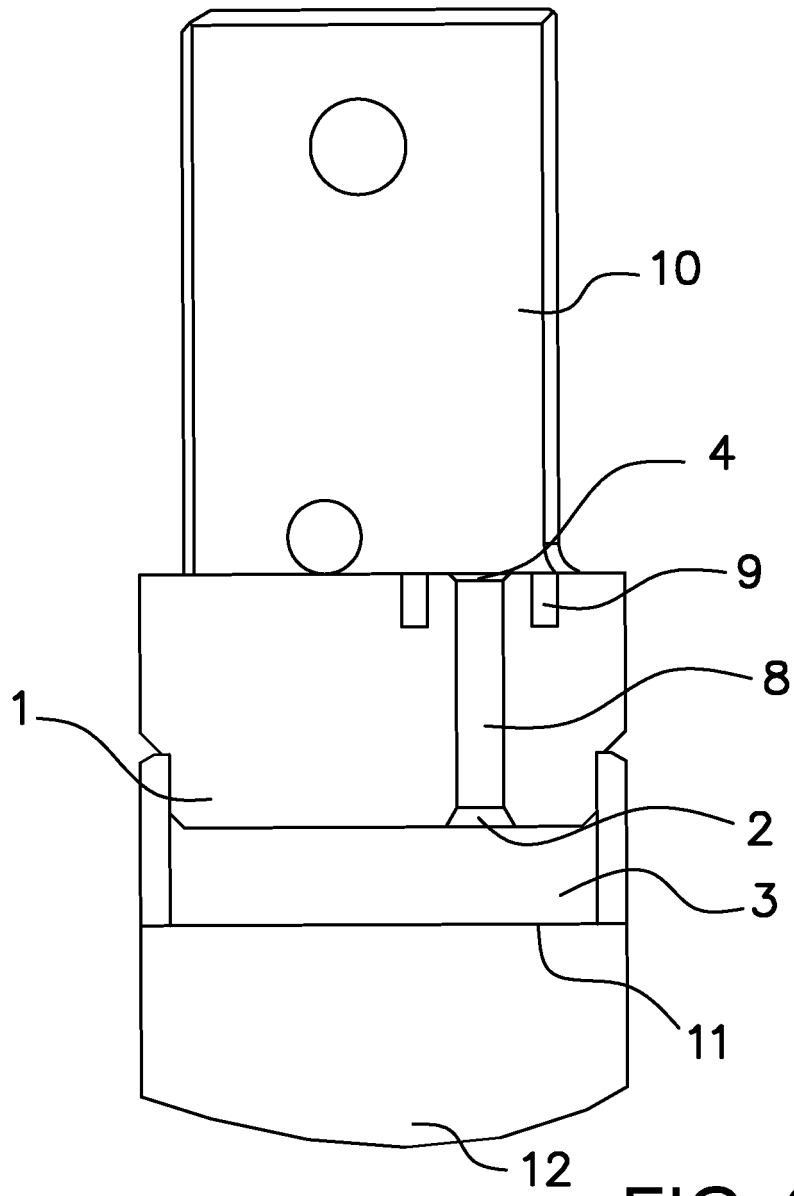


FIG. 1



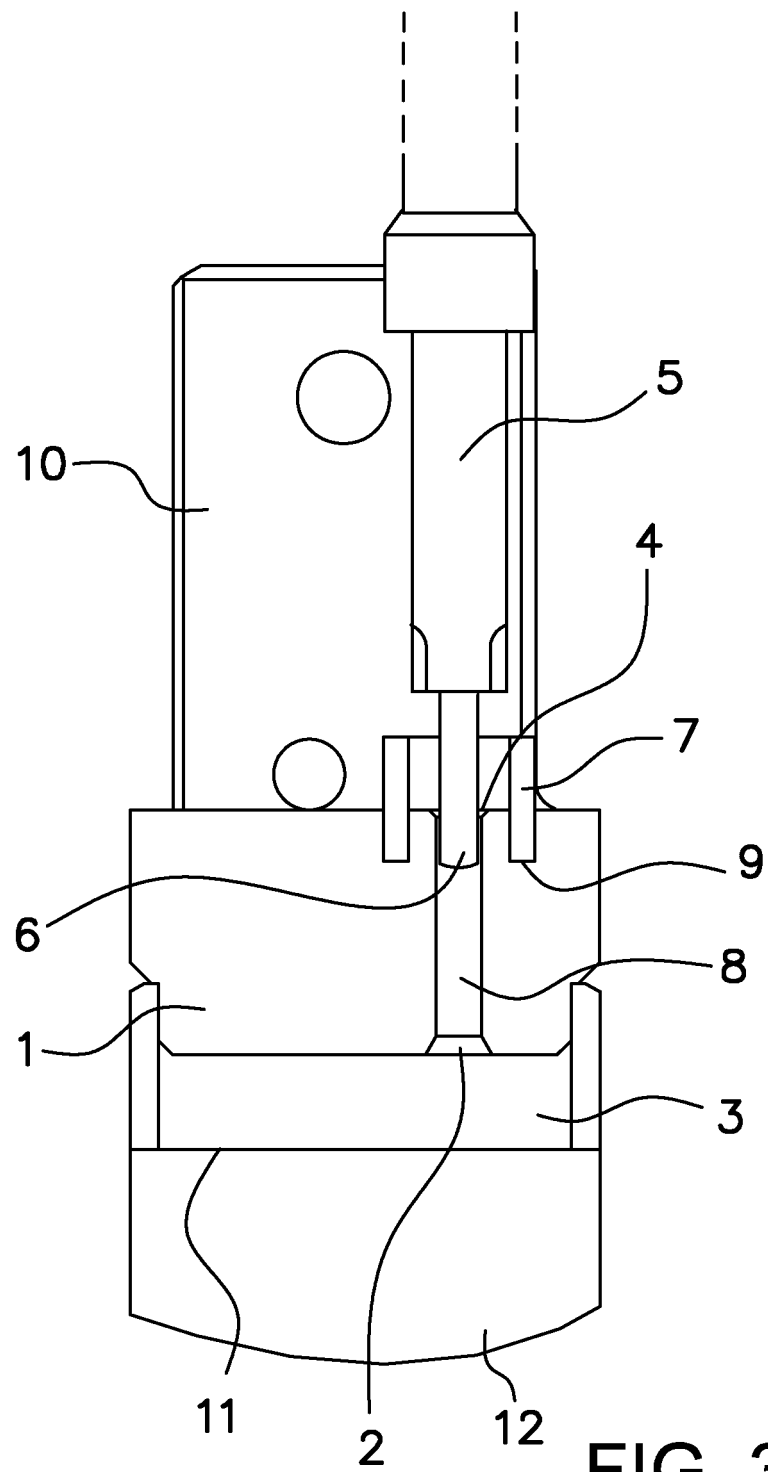


FIG. 3

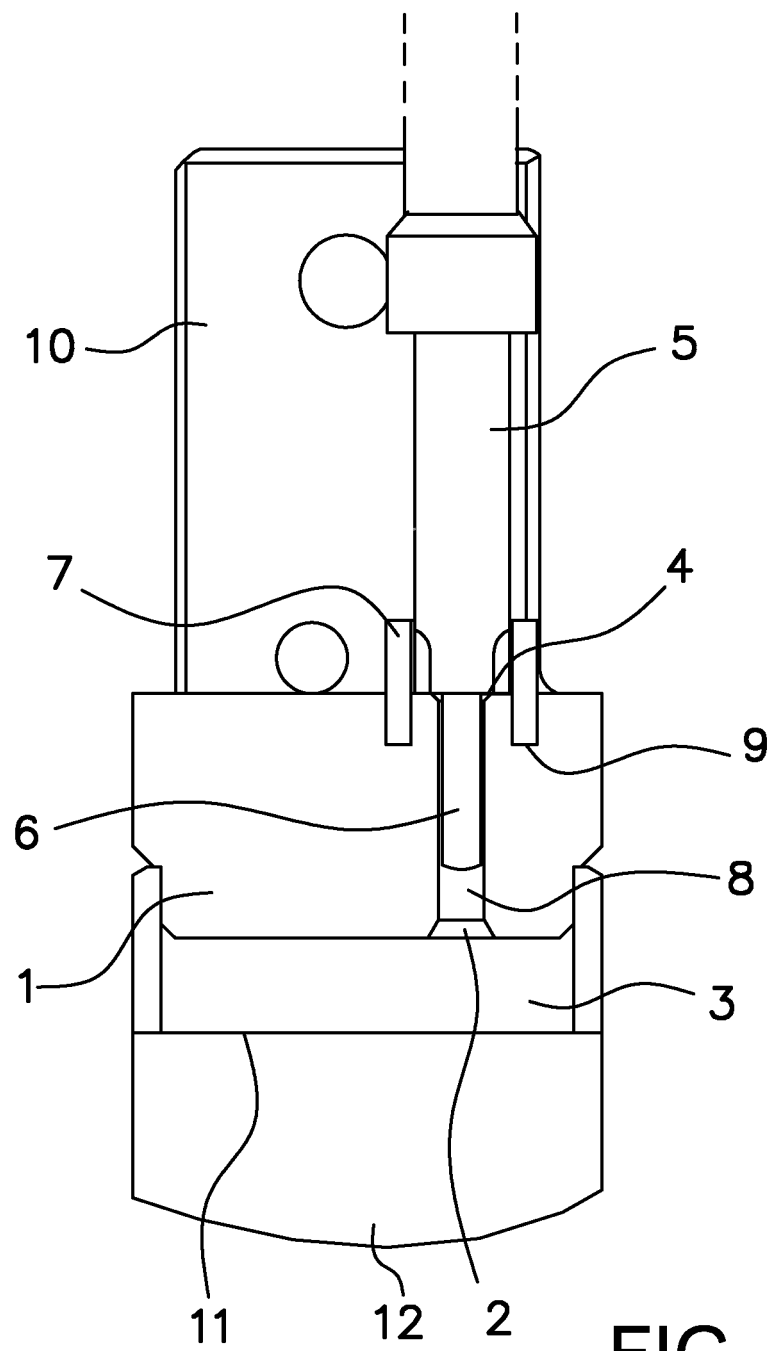


FIG. 4

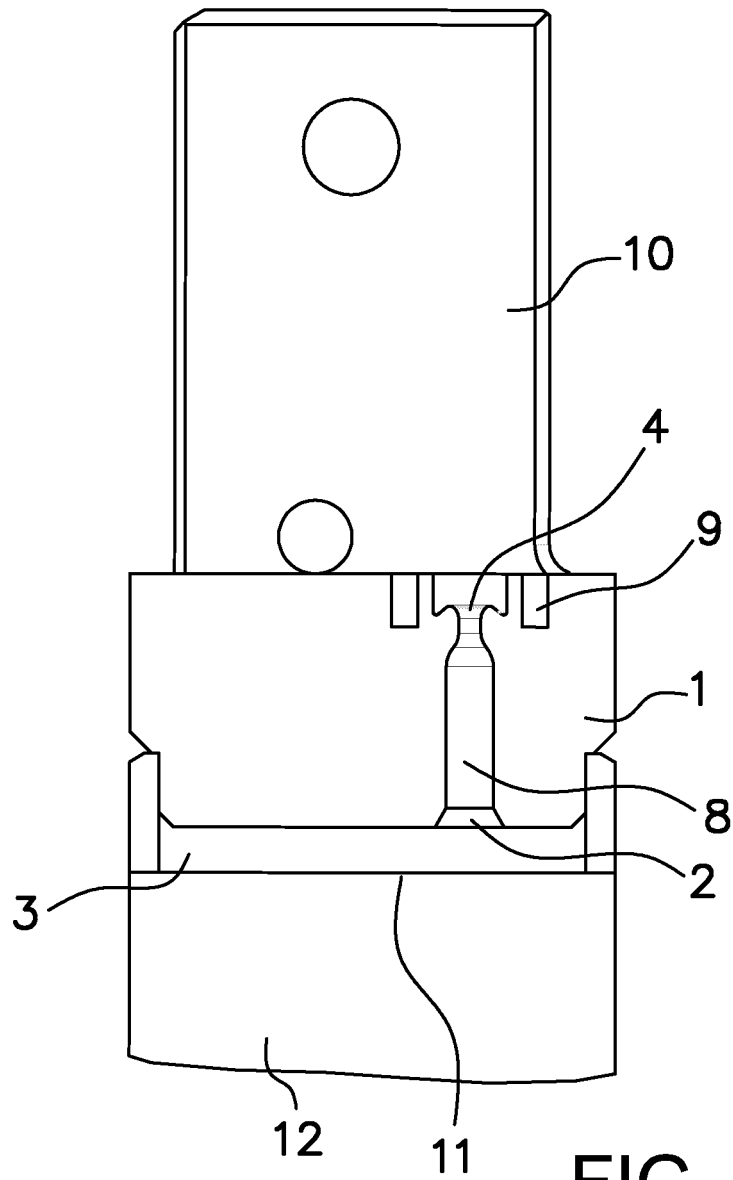


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No

PCT/ES2011/070390

A. CLASSIFICATION OF SUBJECT MATTER

INV. F41B11/32

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F41B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 360 473 B1 (MERCHANT WILLIAM H [US]) 26 March 2002 (2002-03-26) column 1, line 45 - column 3, line 1; claim 1; figures 1-4 -----	1-3,5,6
X	WO 2005/063344 A1 (BENETTI ALFREDO [IT]; BENETTI CLAUDIO [IT]; MENEGHINI ANTONIO [IT]) 14 July 2005 (2005-07-14) page 6 - page 7; figures 1,6-8 -----	1-10
A	WO 98/30859 A1 (MCMULLEN WARWICK CHARLES [AU]) 16 July 1998 (1998-07-16) page 5, paragraph 1; claim 1; figures 1-5 -----	1,2,5,6



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/ES2011/070390

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Non-patent literature cited in the description

- The applicant company of Spanish Utility Model No 0210145. *PNEUMATIC RIFLE WITHOUT RECOIL EFFECT*, 1975 [0003]